SSVEO IFA List **Date:02/27/2003**

STS - 90, OV - 102, Columbia (25) **Time:03:57:PM**

Tracking No	Time	Classification	Documentation		Subsystem
MER - 1	**MET:** Prelaunch	Problem	**FIAR**	**IFA** STS-90-V-01	C&T
	GMT: 106:06:19		**SPR**	**UA**	**Manager:** Chien Hsu
			IPR 93V-0002	**PR**	562-922-5538
					Engineer: Mark Pickens
					281-282-5425

Title: NSP 2 Failure (ORB)

Summary: During the countdown on 4/16/98, shortly before ET tanking, NSP 2 failed to acquire frame sync during the switch from NSP 1 to NSP 2. The downlink was not impacted by this problem. The system was cycled from NSP 1 to NSP 2 nine times through several modes. Each time NSP 1 worked fine but NSP 2 did not. Uplink communications with NSP 2 could not be established. The NSP 2 was removed and replaced with OV-105's NSP 2.

OMRSD File III retest requirements that could not be performed following the NSP 2 replacement on the pad, will be performed during the STS-93 flow. Failure analysis of the NSP is being preformed at the manufacturer.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 3	**MET:** 000:00:03:30	Problem	**FIAR**	**IFA** STS-90-V-02	MPS
	GMT: 107:18:22:30		**SPR**	**UA**	**Manager:** John Kremer
			IPR 93V-0004	**PR**	562-922-1445
					Engineer: Tim Reith
					281-282-5328

Title: Engine 1 LH2 Inlet Pressure Shifted Up (ORB)

Summary: The engine 1 LH2 inlet pressure shifted up about 3 to 4 psia at approximately 107:18:22:30 G.m.t. (000:00:03:30 MET). Similar signatures have been observed on previous flights on other Orbiters. This measurement is primarily used for engineering data during loading. However, it is also used during ascent in the event of a

premature engine shutdown to determine if an LH2 dump can be performed through that engine. As a result, this measurement is listed as criticality 1R2 for aborts. There was no impact to the remainder of the flight.

KSC will troubleshoot and the transducer will probably be removed and replaced.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 14	**MET:** 007:09:30:46	Problem	**FIAR**	**IFA** STS-90-V-03	ECLSS
EECOM-02	**GMT:** 115:03:49:46		**SPR**	**UA**	**Manager:** Don Sandersfeld 562-922-3772
			IPR 93V-0013	**PR**	**Engineer:** Chris Hoffman 281-244-5121

Title: RCRS Shutdown (ORB)

Summary: At 115:03:49:46 G.m.t. (007:09:30:46 MET), the RCRS shut down while on controller 2. The crew reconfigured the RCRS to controller 1, but it too shut down. The crew was told to use LiOH canisters for carbon dioxide removal during their upcoming sleep period. Flight data was reviewed and a fault tree was developed to investigate the cause of the shutdown. An IFM was subsequently developed to recover usage of the RCRS. The IFM isolated a check valve which was believed to be leaking cabin air into the RCRS system. The isolation was regained by disconnecting the outlet hose from the check valve and covering the fitting with aluminum tape. In addition, power was removed from the compressor since it is in the flow path blocked by the IFM procedure. Following the IFM, the RCRS was activated at 115:20:43 G.m.t. (008:02:24 MET) using controller 1. RCRS performance was as expected in light of the IFM modifications. The loss of the RCRS ullage save operation resulting from the compressor being unpowered had no mission impact.

The RCRS will be removed from the vehicle and shipped to the vendor for repair. The RCRS is not being flown on STS-93.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 8	**MET:** 003:04:47	Problem	**FIAR**	**IFA** STS-90-V-04	ECLSS
EECOM-01	**GMT:** 111:02:06		**SPR**	**UA**	**Manager:** Son Nguyen 562-922-1327
			IPR 93V-0012	**PR**	**Engineer:** Dennis Veselka

x40126

Title: FES Shutdowns (ORB)

Summary: The flash evaporator system (FES) primary A controller shut down at approximately 111:02:06 G.m.t. (03:07:47 MET). At that time, the FES inlet temperatures were averaging around 48 ?F. The crew restarted the FES primary A controller 4 minutes after the shutdown occurred. The restart was successful, and the FES went into standby at 111:02:35 G.m.t. (03:08:16 MET); however, the FES failed to come out of the standby mode. At 111:03:13 G.m.t. (03:08:54 MET), the crew switched from the primary A to the primary B controller. The FES gained control for 9 minutes on the primary B controller and then shut down. The FES core flush procedure was implemented. After the flush procedure was completed, the FES primary B controller was successfully restarted. The FES topping duct heaters were placed on heater string A/B for the duration of the crew sleep period and was reconfigured to heater string A following the sleep period.

It is believed that the most probable cause of the shut-down was a rapid FES heat-load transient that occurred while in the -ZLV +YVV water-dump attitude. The FES heat load approached 30,000 Btu/hr, the on-orbit SODB limit, and dropped off rapidly. This transient resulted in the initial formation of ice in the FES topper core which grew in size and eventually lead to the shut-down. Note that the FES is certified to handle a transient of the magnitude seen. The Orbiter water-dump attitudes were changed from -ZLV +YVV to +ZLV +YVV to preclude the FES shut-down conditions from recurring. Also, a planned 14 hour period of -ZLV +YVV near the end of the mission was modified. A FES primary A controller water dump test was began at 122:15:33 G.m.t. (14:21:14 MET). The test lasted 2 hours 7 minutes. There was no indication of water carryover in the core or icing during the dump. A FES core flush procedure was performed, being completed at 122:18:50 G.m.t. (15:00:31 MET). Again, there was no indication of icing. During entry, the FES performed nominally on the primary B controller. Postflight actions at KSC will include the normal every flow borescope of the FES core. A water sample will be taken from a test port on the topping water valve/nozzle assembly. The test port is located between the isolation valve and the spray valve. If the borescope and water sample find nothing anomalous, based on the STS-90 performance of the FES, the unit will be considered acceptable to support the STS-93 mission.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 15	**MET:** 012:03:02	Problem	**FIAR**	**IFA** STS-90-V-05	ECLSS
EECOM-03	**GMT:** 119:21:21		**SPR**	**UA**	**Manager:** Don Sandersfeld 562-922-3772
			IPR 93V-0010	**PR**	**Engineer:** Tracey Riverman x30004

Title: Waste Water Dump Failure (ORB)

Summary: During a waste water dump, the dump rate declined from about 2 % per minute (normal) to about 0.5 %/min, while the nozzle temperatures remained relatively constant (about 75 ?F). The dump was stopped and a nozzle bake-out performed. During the bakeout, the temperature signature did not appear to indicate ice on the nozzle. The dump was re-initiated and the dump rate remained at about 0.5 %/min.

An in-flight maintenance (IFM) procedure was performed at 120:15:08 G.m.t. (12:20:49 MET) to bypass a potentially clogged urine solids filter located in the waste water dump line. The initial dump rates appeared normal (1.73 %/min); however, at 120:15:19 G.m.t. (12:21:00 MET) the dump rate decreased to near zero. The dump was stopped and the dump nozzle bake out was performed. An additional 17 % of quantity was dumped before the dump stopped. A second cycle was attempted, with no corresponding change in tank quantity. A bakeout of the supply and waste water dump nozzles was initiated to determine if ice was present on either nozzle assembly. No ice was indicated. In an effort to further confirm the lack of ice on the supply and waste dump nozzles, the Orbiter was placed into a +ZLV, +YVV water-dump attitude for two orbits. The nozzle temperature profiles in response to environmental heating were then compared to those under similar conditions earlier in the flight and prior to the dump problems. Again no evidence of ice was indicated. At approximately 122:10:40 G.m.t. (014:16:21 MET), waste water was transferred from the waste tank to a CWC to create enough ullage in the tank to support EOM + 2 days. This transfer was nominal. A troubleshooting plan for the contingency dump/collection hardware and the vehicle hardware is in place. The plan includes visual inspections, the taking of samples for chemical and particulate analysis, flow testing, and a leak test. If necessary, a nozzle spray test will be performed.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 2	**MET:** 000:00:11	Problem	**FIAR**	**IFA** STS-90-V-06	HYD
MMACS-01	**GMT:** 107:18:30		**SPR**	**UA**	**Manager:** Bill VanMeter
			IPR 93V-0009	**PR**	562-922-2228
					Engineer: Jim Wiltz
					281-282-5343

Title: WSB 3 Failed to Cool (ORB)

Summary: During ascent, WSB 3 experienced an undercool of the APU 3 lube oil. The APU 3 lube oil return temperature reached 334 ?F (spec is NGT 275 ?F) when the APU was shut down. The controller was switched from A to B when the lube oil reached approximately 300 ?F (107:18:30:46 G.m.t./000:00:11:46 MET) with no spray cooling observed at that time. APU 3 was shut down at 107:18:32:12 G.m.t. (000:00:13:12 MET), approximately 2 minutes earlier than planned. Data review indicate that no spraying was achieved on either controller.

No cooling and undercools during ascent have been seen previously on this and other WSBs. Typically, this behavior is believed to be caused by ice forming on the WSB spray bars. As a result, APU 3 was run during FCS checkout to verify WSB 3 operation. Spraying was not seen on either the WSB A or B controllers. During entry, APU 3 was started at TAEM with WSB 3 configured on the B controller. No spraying was seen on entry and APU 3 was shut down 2 minutes and 28 seconds after touchdown when the lube oil return temperature reached its FDA limit of 290 ?F. A troubleshooting plan has been developed. Troubleshooting will include visual inspection, OMRSD checkout of the lube oil spray valve, hydraulic spray valve, and the temperature sensors, checkout of the feedline heater circuit, and offload of water from the tank. The WSB will probably be removed and replaced.